

July 25, 2001

Mr. Ronald A. Milner, Chief Operating Officer
Office of Civilian Radioactive Waste Management
U. S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585

SUBJECT: U.S. NUCLEAR REGULATORY COMMISSION'S OBSERVATION AUDIT
REPORT NO. OAR-01-07, "OBSERVATION AUDIT OF THE BECHTEL SAIC
COMPANY, LLC, AUDIT NO. BSC-SA-01-021 OF FRAMATOME ANP, INC."

Dear Mr. Milner:

I am transmitting the U.S. Nuclear Regulatory Commission's (NRC's) Observation Audit Report (No. OAR-01-07) of the U.S. Department of Energy's (DOE's), Office of Civilian Radioactive Waste Management (OCRWM), Management and Operating Contractor, Bechtel SAIC Company, LLC (BSC), Quality Assurance (QA), audit of Framatome ANP, Inc. (Framatome). This audit was conducted on June 19 through 21, 2001, at various Framatome facilities in Lynchburg, Virginia.

The purpose of this audit was to evaluate the effectiveness of the implementation of Framatome's QA Program (QAP), as approved by BSC, and to determine if applicable requirements of the OCRWM Quality Assurance Program Description (QARD) were being met. The scope of the audit included evaluating the implementation of the QARD and QAP for the welding and nondestructive examination of samples supporting the design of the high-level waste containers for the proposed repository at Yucca Mountain, Nevada.

The NRC observers (observers) determined that this audit was effective in identifying potential deficiencies and recommending improvements for the Framatome activities reviewed. During the conduct of the audit, both the BSC audit team (audit team) and the observers independently reviewed applicable documents, procedures, and activities within the audit's scope.

Also, the audit team and observers reviewed and observed welding and nondestructive activities for the production of welded samples that will be used for corrosion testing and analysis of the stresses in the waste container closure weld. The audit team identified some minor problems in the areas of documenting and processing nonconforming conditions and identifying the status of measuring and test equipment. These problems were corrected during the audit. Additionally, the audit team identified a potential deficiency in the area of procurement. The staff believes that this BSC audit was well-planned, thorough, and adequately evaluated Framatome's welding and nondestructive examination activities.

The observers agreed with the audit team's conclusions, findings, and recommendations presented at the audit exit. Notwithstanding the audit team's findings, the staff believes that Framatome is properly controlling welding and nondestructive examination activities within the

R. Milner

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scope of the audit. The staff will continue to interface with OCRWM and follow the progress that Framatome is making to address the issues identified during this audit.

A written response to this letter and the enclosed report is not required; however, we do request that you respond to the open Audit Observer Inquiries from the previous NRC observations identified in Section 5.3 of the attached report. If you have any questions, please contact Larry L. Campbell at (301) 415-5000.

Sincerely,

/RA/

C. William Reamer, Chief
High-Level Waste Branch
Division of Waste Management
Office of Nuclear Material Safety
and Safeguards

Enclosure: NRC Observation Audit Report
No. OAR-01-07, "Observation Audit
of the Bechtel SAIC Company, LLC,
Audit No. BSC-SA-01-21 of Framatome ANP, Inc."

CC: See attached list

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Letter to R. Milner from C.W. Reamer dated: July 25, 2001

cc:

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U.S. NUCLEAR REGULATORY COMMISSION
OBSERVATION AUDIT REPORT NO. OAR-01-07
“OBSERVATION AUDIT OF THE
BECHTEL SAIC COMPANY, LLC
AUDIT NO. BSC-SA-01-21 OF FRAMATOME ANP, INC.”

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1.0 INTRODUCTION

1.1 Framatome ANP, Inc.(Background)

The current statement of work agreement between the U.S. Department of Energy (DOE) Office of Civilian Radioactive Waste Management (OCRWM), Management and Operating Contractor (M&O) and Framatome ANP, Inc (Framatome) is Subcontract Change Notice No. 10, dated February 23, 2001, to Subcontract No. BSC SOW #FCF-LV.STR.REV.02/01-006 for Master Subcontract No. A06607GN8S. Framatome has been contracted to provide engineering and technical services as directed by the M&O Waste Package Project Manager.

The overall scope of Framatome's work includes the development of fabrication and closure welding processes and systems for the waste package. This scope includes investigating and developing the fabrication process and verification techniques necessary to implement the high-level waste container design for the proposed repository at Yucca Mountain, Nevada. Also, the scope includes providing samples for the materials testing program for further study which includes activities such as the following: evaluating and developing an alternate weld processes for process optimization; weld groove design and weld closure sequence, and the weld system; performing residual stress comparative (process) studies; determining weld filler metal composition range(s); and providing the minimum weld defect size, the annealing procedure and specification, and the welded and non-welded engineered barrier materials for the materials testing program.

The observers note that the base metal material used for welding the samples was American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME), Section II, "Materials," Specification SB-575 (C-22).

1.2 Performance of the Audit

Staff from the U.S. Nuclear Regulatory Commission (NRC), Division of Waste Management, and the Center for Nuclear Waste Regulatory Analyses Center (CNWRA) observed the M&O, Bechtel, SAIC Company, LLC (BSC) audit of activities regarding the implementation of Framatome's Quality Assurance Program (QAP). This audit was conducted on June 19 through 21, 2001, at various Framatome's facilities in Lynchburg, Virginia.

The purpose of this audit was to evaluate the effectiveness of the implementation of Framatome's QAP, as approved by BSC, and to determine if applicable requirements of the OCRWM Quality Assurance Program Description (QARD) were being met. The scope of the audit included evaluating the implementation of the QARD and QAP for the welding and nondestructive examination of samples supporting the design of the high-level waste containers for the proposed repository at Yucca Mountain, Nevada.

The NRC observers' (observers') objective was to assess whether BSC Quality Assurance (QA), Product Quality Engineering/Supplier Audits and Evaluation Section, audit team (audit team) and Framatome were properly implementing the requirements contained in Subpart G, "Quality Assurance," to Part 60, of Title 10 of the U.S. Code of Federal Regulations (10 CFR Part 60) and the provisions contained in the QARD. Prior to the start of the audit, the audit team and observers were provided a tour of the Framatome facility.

This report presents the observers' determination of how effective the BSC audit was, and whether Framatome implemented adequate QARD and QAP controls in the audited areas.

2.0 MANAGEMENT SUMMARY

Within the areas evaluated, the audit team identified several minor potential deficiencies. These deficiencies did not appear to impact the quality and technical adequacy of the Framatome products being supplied to BSC. During the audit, Framatome took action to correct the following three deficiencies: 1) a procedure change was initiated for a liquid penetrant procedure to indicate specific penetrant material to be used for examinations performed at the Framatome's facilities; 2) a nonconformance was initiated to correct a calibration due date discrepancy; and 3) a nonconformance report was revised to identify specific items that were rejected. The audit team identified the following potential deficiencies during the audit against a purchase order (PO) to one supplier, Spec/American Technical Services, Inc.: 1) Framatome failed to specify, on one purchase order, the specific QA program for the supplier to use; and 2) applicable procurement documents did not address the restrictions noted on the Framatome Approved Supplier List (ASL).

The audit team identified the following as an open item that it would be discussing with BSC management: Framatome's practice is for its QA personnel to independently review purchase requisitions (PRs) containing the quality and technical requirements to be followed by the supplier. However, the POs, incorporating the QA and technical requirements from the PR, are not required to be reviewed by Framatome's QA personnel. The audit team questioned why Framatome's QA personnel were not reviewing the completed POs.

The observers determined that BSC Audit No. BSC-SA-01-21 was well-planned and effectively executed. The audit team members were independent of the activities they audited and were knowledgeable in the QA and technical disciplines within the scope of the audit. The audit team members' qualifications were reviewed and were found acceptable.

With the exceptions of the potential deficiencies, the audit team concluded that the QARD and QAP had been satisfactorily implemented in the areas evaluated. The observers agreed with the audit team's conclusions, findings, and recommendations presented at the audit exit. The staff will continue to interface with OCRWM and follow the progress that Framatome is making to address the issues identified during this audit.

3.0 AUDIT PARTICIPANTS

3.1 Observers

Larry L. Campbell	Team Leader	NRC
Brett Neuberger	Technical Specialist	NRC
Tomas C. Trbovich	QA Specialist	CNWRA

3.2 BSC Audit Team

Robert D. Habbe	Audit Team Leader	BSC QA
Richard L. Hand	Auditor	BSC QA

4.0 REVIEW OF THE AUDIT AND AUDITED ORGANIZATION

This BSC QA audit of Framatome was conducted in accordance with OCRWM Quality Assurance Procedure (QAP) 18.2, "Internal Audit Program," and QAP 16.1Q, "Performance/Deficiency Reporting." The NRC staff's observation of this audit was based on NRC Manual Chapter 2410, "Conduct of Observation Audits," dated July 12, 2000.

4.1 Scope of the Audit

The scope of the audit included evaluating the implementation of the QARD and QAP for the welding and nondestructive examination of samples supporting the design of the high-level waste containers for the proposed repository at Yucca Mountain, Nevada.

4.2 Conduct and Timing of the Audit

The audit was performed effectively and the audit team demonstrated a sound knowledge of the applicable Framatome programs and procedures. The audit checklist was developed using the QARD and the Framatome QAP. Applicable Framatome implementing procedures were used during the audit. Audit team members conducted thorough interviews; they challenged responses, when appropriate; and they effectively employed their detailed audit checklists. The observers concluded that the timing of the audit was appropriate for the auditors to evaluate ongoing Framatome welding and nondestructive examination activities. The audit team and the observers caucused at the end of each day. Meetings between the audit team and Framatome (with the observers present) were held, as necessary, to discuss the current audit status and preliminary findings.

4.3 Audit Team Qualification and Independence

The qualifications of the audit team were reviewed for accuracy and completeness in accordance with the requirements of DOE Procedure QAP 18.1, "Auditor Qualification." The observers' review included an examination of the training, education, and experience of the audit team members. The observers concluded that the audit team members had the necessary expertise to perform the audit and were qualified to audit Framatome's activities.

The observers reviewed organizational information and determined that the audit team members were independent of any direct responsibility for performing audited activities. The observers concluded that the auditors had sufficient authority and organizational freedom to make the audit process meaningful and effective.

4.4 Examination of QA Elements

4.4.1 QA Program, Procedures, and Training

The audit team reviewed the Framatome organization structure and determined that it provided adequate organization freedom for the Framatome QA organization to perform its independent functions. The audit team determined that adequate policies, procedures, and instructions were available and properly controlled for performing quality related activities supporting the manufacture of DOE's welded samples.

Also, the audit team reviewed several indoctrination, training, and qualification records for Framatome personnel engaged in the activities covered by the QAP and found them acceptable. Specifically, the audit team reviewed several records for personnel performing welding, nondestructive examination, inspection, auditing, and engineering activities related to the welded samples and found them acceptable.

The observers agreed with the audit team's findings in this area.

4.4.2 Document Control

The audit team reviewed the document control process for several Framatome documents including the QAP, procedures controlling the manufacture of the welded samples, master document lists, document control logs, and changes to these documents. Although, the audit team found no deficiencies in this area, the audit team questioned Framatome's practice of not documenting the satisfactory resolution of the comments provided for procedure changes. The audit team recommended that administrative procedure be clarified with respect to documenting the resolution of comments.

The observers agreed with the audit team's findings in this area.

4.4.3 Procurement

The audit team reviewed the following two POs for compliance with procedural requirements.

PO No. 88855 was issued to Nooter Fabricators, Inc. for the Waste Package Mock-up Fabrication. The audit team found that the restrictions identified on the ASL for this supplier was noted on the PO and the PO had received the necessary internal reviews prior to order placement.

PO No. 101028 was issued to Spec/American Technical Services, Inc. for nondestructive examination services. The audit team found that this PO failed to meet the requirements of the QARD and DOE's contractual Yucca Mountain Technical Requirements Document because it did not specifically identify a requirement for the use of the approved QA program. Further, the audit team found that this PO did not incorporate the restrictions identified on the ASL for Spec/American Technical Services, Inc. During the audit exit, the audit team identified these findings as potential deficiencies.

Further, the audit team questioned Framatome's practice of having its QA personnel review the PR rather than the completed PO. The audit team indicated that this on-going Framatome

practice will be discussed with BSC management and the previous BSC audit team leader before any determination is made on the issuance of a deficiency.

The observers agreed with the audit team's findings in this area.

4.4.4 Identification & Control of Items and Materials

During the review of fabrication practices, the audit team and observers found that the restrained weld mock-ups and welded corrosion sample plates had proper piece identification (heat/lot number; assembly number). The audit team found that the processing of these samples was properly controlled throughout the various operations, by the use of a shop traveler, in accordance with Framatome Working Instruction 8, Rev. 10. The audit team identified no deficiencies in this area.

The audit team and observers questioned Framatome's procedure controlling the identification of nonconforming items. During the audit, a piece of a welded sample, previously found to be unacceptable, had no identification on it, such as a tag, indicating that it was unacceptable for use and had been formally rejected. The audit team and observers found that Framatome's procedure and practice for controlling nonconforming items does not specifically require that rejected items be identified as rejected by the use of tags or other identification methods. The audit team recommended that Framatome review its current practice regarding when nonconforming items need to be identified as nonconforming by tagging the item and that Framatome tag all nonconforming items, when practical. This recommendation is discussed further in Section 4.4.10 of this report.

The observers agreed with the audit team's findings in this area.

4.4.5 Control of Special Processes

The audit team reviewed the control of special processes including the qualification of procedures and personnel used for welding and nondestructive examination. The qualification of welding and nondestructive examination personnel and procedures are performed by Framatome in accordance with Working Instruction 23, Rev 3, and specific manuals.

The audit team reviewed several Framatome nondestructive examination procedures and found them acceptable except for Liquid Penetrant (PT) Procedure No. 54-PT-6-07. Framatome's PT Procedure No. 54-PT-6-07 identified qualified materials from two suppliers (Magnaflux and Androx) for use. However, the audit team found that only Magnaflux materials were identified and qualified in Procedure Qualification (PQ) 240-06 for this procedure. Framatome personnel stated that there were no Androx materials in house and that these materials were only used at a client facility when supplied by the client. During the audit, Framatome initialed corrective action to have the PT procedure revised by removing the Androx materials. Since Magnaflux materials were used on the weld mock-ups and C-22 corrosion plates, as witnessed during corrosion plate weld test performance, this procedural error does not invalidate any PT examinations performed under the BSC contract.

A review of Framatome's welding and nondestructive examination personnel qualification records and weld procedure qualification records revealed no discrepancies.

The observers agreed with the audit team's findings in this area.

4.4.6 Inspection (and Inspection, Test and Operating Status)

The audit team found that required independent inspections were identified in the shop traveler package by two methods: the use of a specific procedure placed in the shop traveler package or specific inspection instructions are identified in the shop traveler. The inspection activities reviewed were performed by qualified personnel and recorded on an inspection report or on a specific sequence step of the shop traveler. The audit team found no discrepancies in this area and concluded that inspections were performed in accordance with Framatome Working Instruction Nos. 13 and 14.

The audit team found that the inspection, test, and operating status for items were being properly controlled through the use of shop travelers. The audit team found that the status of inspection and test activities were identified either on the shop traveler or on a separate inspection report. No discrepancies were noted with this element.

The observers agreed with the audit team's findings in this area.

4.4.7 Control of Measuring and Test Equipment

The audit team checked several dimensional inspection tools used during receiving inspections, and recorded their serial numbers. Next, the audit team traced the corresponding serial numbers to the calibration records.

The audit team found that calibration stickers were recorded for a welding station positioning device, power supply, and thermometer. The audit team reviewed the calibration records for these items. The audit team identified a discrepancy with the due date for calibration of the weld positioning head calibration sticker and corresponding calibration record. During the audit, Framatome initiated a nonconformance report to document this discrepancy and to correct the calibration sticker on the device to agree with the calibration record.

During the audit, Framatome informed the audit team that it was in process of establishing a new system for recording calibrated equipment usage to make it easier to track should the equipment be identified as being out of calibration. The audit team identified no other discrepancies in this area.

The observers agreed with the audit team's findings in this area.

4.4.9 Handling, Storage, and Shipping

The audit team reviewed and examined four restrained weld mock-up assemblies prepared for shipment. The audit team found that packaging was completed in accordance with applicable instructions noted in the shop traveler and approved shipping authorization. The audit team identified no discrepancies in this area.

The observers agreed with the audit team's findings in this area.

4.4.10 Control of Nonconforming Items

The audit team found that accepted materials and completed products, such as the completed C-22 welded samples, requiring adherence to quality requirements, were stored in an area clearly identified as a “safety required” control zone. During the audit, the audit team and observers found a rejected piece of C-22 corrosion plate placed in this control zone. The audit team followed up on this item and found that Framatome had issued a nonconformance report to document rejected C-22 welded sample plates because the radiographic examination of the plates revealed unacceptable indications in the sample’s weld. The audit team found that a subsequent Nondestructive Examination Level III evaluation report identified eight assemblies evaluated for linear inclusions. The original Nonconformance Report (NCR) No. 6008476 identified only two C-22 welded sample plate assemblies (C-9 and D-18) rejected for linear inclusions. Framatome informed the audit team that subsequent radiographic film evaluation and metallographic analysis determined that the identified indications, previously identified as inclusions, were actually porosity. Framatome indicated that its personnel were initiating another revision to the NCR for a complete and total listing of plate assembly identifications.

Framatome explained that its Working Instruction No. 9, Revision 6, requires items to be tagged when practical. The audit team and observers found that the form used to document the nonconforming condition appears to give an option for tagging. Framatome’s practice is not to use tags and to indicate in the tag use box on the NCR form, that no tag was used by checking the ‘no’ tag used box on the NCR form. The audit team expressed a concern about Framatome’s practice of not tagging nonconforming items.

In another situation, a two inch piece of welded plate from the weld defect analysis was moved from the controlled zone to a non-safety unidentified stack of material that was verbally identified as ‘scrap’ without the completion of a nonconformance or other controlling paperwork. Again, the audit team expressed a concern to Framatome because the rejected piece of C-22 material had no identification on it to indicate that it was rejected. As previously discussed in this report, the audit team recommended that Framatome review its current practice regarding when nonconforming items need to be identified as nonconforming by tagging the item and that Framatome tag all nonconforming items, when practical.

The observers agreed with the audit team’s findings in this area.

4.4.11 Corrective Action

Framatome Procedure No. AP-1703-01 provides requirements for controlling corrective action. No Corrective Action Requests, identifying significant conditions adverse to quality, have been initiated for the BSC contract and therefore this element was judged to be not applicable by the auditors.

The observers agreed with the audit team’s findings in this area.

4.4.13 Records

The audit team reviewed several types of records during the audit including, but not limited to, those for: personnel training and qualification; procedure qualifications; audits; QAP and procedure change control; inspection; nondestructive examination; welding; and shop fabrication. The audit team identified no discrepancies were in this area.

The observers agreed with the audit team’s findings in this area.

4.4.14 Audits

The audit team reviewed several audit reports including suppliers supporting the work that Framatome performed for BSC. The audit team identified no discrepancies in this area.

The observers agreed with the audit team's findings in this area.

4.4.5 Technical Review

During the audit, the observers discussed the welded C-22 sample plates with the BSC Waste Package Project Manager. Table 1, "Welded C-22 Samples," of this report provides a summary of the information obtained from these discussions and the observers' review of Framatome technical documents.

<u>Sample Type</u>	<u>Welding Process Used</u>	<u>Plate Length, Width, Thickness</u>	<u>Root Pass Depth</u>	<u>Weld Joint Type</u>	<u>Nondestructive Examination for Sample Weld</u>
Corrosion Test Samples	Narrow-Groove GTAW	37.9"x4"x1.5"	0.050" each	Double-U Groove	PT on backside of root pass Remainder 10% RT & PT
Strain Test Samples	Optimized GTAW	12"x4"x0.75"	0.047"	Single-U Groove	PT UT
Strain Test Samples	Narrow-groove GTAW	12"x4"x0.75"	0.090"	Single-U Groove	PT UT
Strain Test Samples	PAW	12"x4"x0.75"	0.4375"	Single-U Groove	PT UT
TABLE 1- WELDED C-22 SAMPLES					

Table 1 Acronyms: Liquid Penetrant Examination (PT); Radiographic Examination (RT); Ultrasonic Examination (UT); Gas Tungsten Arc Welding (GTAW); Plasma Arc Welding (PAW)

Notes for Table 1:

1. All welded samples were fabricated using C-22 base metal material and welded using ER-Ni-Cr-Mo-Sn weld filler material.
2. All base metal weld preparations were machined and subjected to a visual inspection and cleaned using acetone.
3. Plate dimensions (length, width, and thickness) are for one plate. Two plates were welded together for final product.
4. A visual inspection was performed on the completed weldment prior to nondestructive examination to ensure the surface was acceptable for the examination.
5. Strain test samples were welded in a box that provided restraint in all 6 degrees of freedom. Bolts were torqued to specified initial value, securing and restraining the plates, prior to welding.

6. Strain test samples were sent to a supplier for determination of residual stresses. However, the torqued bolts were not locked into a permanent position by any means such as locking tabs or lockwire. Therefore, there was no guarantee that the bolts would not loosen during transportation process.
7. Requirements for the corrosion test samples were an even heat effected zone and a straight plate. The test process was not specified.
8. Approximately 15 to 20 weld passes, on each side of the plates, were used to produce the corrosion test samples.
9. Materials Testing, Inc. will cut and prepare specimens from the welded samples. The samples will be forwarded to Lawrence Livermore National Laboratory for the coordination of specimen testing at other facilities.
10. PAW is accomplished in 2 passes.
11. The plate thickness for the strain test samples was determined by thickness capable of being produced by PAW process. The plates used for this test were machined down from an original of thickness of 1.5 inches.

5.0 NRC STAFF FINDINGS

The observers determined that Audit No. BSC-SA-01-21 was effective in determining the level of compliance of Framatome's activities associated with the manufacturing of welded C-22 samples. The observers agreed with the audit team's conclusion that the QARD and QAP had been satisfactorily implemented except for the identified potential deficiencies.

5.1 NRC Audit Exit Summary

During the audit exit, the observers expressed appreciation for the excellent cooperation and responsiveness provided to them during their observation activities. In addition, the observers stated that they agreed with the audit team findings and recommendations, as presented at the audit exit. Also, during the audit exit, the observers stated that they will continue to interface with DOE and BSC and follow the progress that Framatome is making to address the issues identified during this audit.

5.2 NRC Audit Observer Inquiries

There were no Audit Observer Inquires (AOIs) written during this audit.

5.3 Open NRC AOIs from Previous NRC Observations

The following AOIs remain open from previous NRC audits:

- a) AOI No. M&O-APR-01-02-4, dated February 9, 2001, was written to identify an observer inquiry for ANL-NBS-HS-00032. The AOI states: "The work upon which this model is based (Flint, et al., 1996, "Conceptual and Numerical Model of Infiltration at Yucca Mountain") is unqualified. (See OCRWM QA Audit Report M&O APR-00-04)(p. 9). Was information used to support the conclusions made in the Infiltration AMR? If yes, describe how the Flint, et al. (1996) data were qualified and assumptions verified. NRC requests additional information and details. (Refer to U.S. NRC's Observation Audit Report No. OAR-00-04)."

- b) AOI No. M&O-APR-01-01-01, February 2001, was written to identify an observer inquiry for ANL-EBS-MD-000033. Several agreements made at the NRC/DOE Technical Exchange (January 9-12, 2001, Pleasanton, CA) on Evolution of the near Field Environment (EMFE) indicate that new data and analysis will be presented in the "EBS: Physical and Chemical Environment Model AMR (ANL-EBS-MD-000033)," expected to be available in FY 02. The following NRC/DOE agreements point specifically to the FY 02 revision of this AMR: ENFE 2.04; ENFE 2.06; ENFE 2.08; ENFE 2.11; ENFE 2.13, and ENFE 2.18. ENFE 2.05 and ENFE 2.17 also point to this AMR, although they state the information can be provided in other documents as appropriate. During the M&O-ARP-01 audit of ANL-EBS-MD-000033, Rev. 01, in Las Vegas, NV (February 20-23, 2001), however, audit team members questioned the usefulness of producing additional revisions of this AMR. If data and analyses required to fulfill NRC/DOE agreements listed above are not presented in a FY 02 revision of the ANL-EBS-MD-000033 AMR, where will this information be presented?" (Refer to U.S. NRC's Observation Audit Report No. QAR-01-03).